# SUMMARY REPORT

## Introduction

Sustainable Resource Group, with assistance of First Environment, prepared and delivered a workshop on September 8, 2008 (held in Grand Rapids, Michigan). This workshop focused on the topics of competency and competency-based training for pollution prevention and lean practitioners. This report will summarize the information that was prepared as a result of this focused workshop. Each of the items is attached to this summary report. A brief description is provided with the listing of these items below.

## Overview of "Competency"

**Attachment 1** contains a description of the term – "competency." It is based on international definitions and practice. This definition was sent to the participants prior to the commencement of the workshop. This term includes – knowledge, skills and attributes (KSAs).

## Competency Table and Supporting Information

**Attachment 2** is a competency table that is prepared using the international protocol developed by RABQSA. It is designed to help an individual determine how to develop the competency for operating as a practitioner in the pollution prevention or lean field.

**Attachment 3** contains further information on the knowledge component associated with the competency table.

**Attachment 4** contains further information on the skills component associated with the competency table.

**Attachment 5** contains further information on the attributes component associated with the competency table.

## Overview of Competency-Based Training

**Attachment 6** provides an overview of competency-based training. Like the description of competency, it is based on international conventions and practice. This overview was sent to the participants prior to the commencement of the workshop.

## Use of Competency-Based Training

**Attachment 7** provides an overview of how competency-based training is used in conjunction with "Recognition of Prior Learning" to help individuals demonstrate their competency to a trained and certified third party. While it was not the intention of the workshop to promote independent certification of pollution prevention and lean practitioners, other organizations have used these or similar methods to establish and maintain various types of certification programs.

**Attachment 8** provides the contents of Exercise 1 used at the workshop (PowerPoint slides and Instruction/Worksheets).

**Attachment 9** provides the contents of Exercise 2 used at the workshop (PowerPoint slides and Instruction/Worksheets).

## Workshop Summary

**Attachment 10** contains the Agenda from the workshop.

**Attachment 11** contains the names and affiliations of the attendees at the workshop.

**Attachment 12** contains notes taken at the workshop based on the participation of the workshop members.

# COMPETENCY

## Competency Introduction

A ***competency*** refers to an individual's ***demonstrated*** knowledge, skills and attributes (KSA's) and the ability required for effective performance in practice. Competencies are observable, behavioral acts that require a combination of KSA's to execute. They are demonstrated in an exercise during competency-based training or by evidence produced by a candidate for "recognition of prior learning" (RPL) through an independent, trained examiner.

While there are those who want to certify the competency of practitioners, individuals can use this concept of competency to continuously improve their own ability to practice in their chosen profession. This project was designed to look at competency in this light. It is very important that pollution prevention (P2) and lean practitioners working in projects for any of the organizations represented by the logos presented at the top of this page clearly understand the concept of competency and how it affects their performance on projects conducted within these programs.

Some of the materials used in these presentation materials come from certification programs operated by the Society of Manufacturing Engineers, RABQSA, the Project Managers' Institute and the American Society for quality. Most of these programs offer information on competency on their web sites. The dimensions of competency used here are from the international programs that use the KSA concept and not just limiting it to one or two of these dimensions. Competency is not equivalent to literacy or qualifications. These more limited concepts are more widely used here in the United States. More organizations and professions are beginning to use this broader international definition of competency.

In the sections to follow, an example of a competency table will be presented along with separate tables listing the types of information that may be included under each of the KSA headings. Competency-based training will be covered in a separate section. It is hoped that this information will be useful to P2 and lean practitioners as well as the people that contract for their services.

# COMPETENCY TABLE

| Competency | Performance Criteria | Evidence Guide* |
|---|---|---|
| **1. Understand and have access to a "body of knowledge.** | 1.1 A "body of knowledge" can be accessed and understood. | • Access to and understanding of various lean and pollution prevention methodologies;<br>• Maintain a personal library, a company library, a computer database or other collection of information. |
| | 1.2 Taken courses with a focus on lean or pollution prevention that address the items in the knowledge table | • Successful completion of courses on lean or pollution prevention and related topics – documentation required<br>• Certified in lean or pollution prevention |
| | 1.3 Taught courses or short courses on lean or pollution prevention (see the knowledge table) | • Taught courses with student evaluation of knowledge of instructor – evaluations required |
| | 1.4 Have an education that supports the knowledge that is required for lean or pollution prevention projects | • Has taken courses in business management, chemistry, mathematics and other disciplines needed to support the work |
| **2. Demonstrate the *skills* to use lean knowledge during project assignments** | 2.1 Work experience can be demonstrated for each area of pollution prevention or lean listed in the skill table. | • References from clients attesting to skill in using the methods listed above |
| | 2.2 Demonstrated ability in each area of pollution prevention or lean listed in skill table. | • Demonstrate practitioner skills in competency-based training |

# COMPETENCY TABLE

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| | 2.3 Demonstration of the effectiveness of pollution prevention or lean activities listed in the skills table. | • Demonstrate effectiveness of Pollution prevention or lean activities in competency-based training |
| **3. Demonstrate the attributes for lean practitioners** | 3.1 Attest to attributes listed in the table from former clients | • References from clients attesting to possession of pollution prevention or lean practitioner attributes |
| | 3.2 Practice personal attributes necessary for the effective and efficient conduct of pollution prevention or lean services | • Demonstrate attributes in competency-based training |
| **4. Demonstrate important communication skills for lean practitioners** | 4.1 Effective communication is practiced | • Knowledge of effective communication (verbal, written and listening) is demonstrated |
| | 4.2. Interview skills are used to effectively acquire information required for the pollution prevention or lean activity | • Knowledge of effective interview techniques to acquire valid evidence is demonstrated |
| | 4.3 Written comments in pollution prevention or lean documentation accurately reflect findings, observations and interventions | • Lean findings and results are recorded accurately, analyzed, prioritized and summarized<br>• Reports are clear, concise and unambiguous |
| | 4.4 The requirements for information security are understood and applied | • Engagement reports and all notes are securely maintained<br>• Engagement outcomes are not discussed with or distributed to unauthorized personnel |

# COMPETENCY TABLE

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| | 4.5 Understand the application of the regulations, industry codes of practice and other considerations that are relevant to the pollution prevention or lean effort (e.g., environmental, health and safety regulations) | • An understanding of how relevant regulations, legal requirements and codes of practice are applied within the organization where the lean service is being provided |
| | 4.6 Understand the impact of cultural, religious, and/or social customs of the lean process is understood | • Any cultural, religious or social customs of the engaging organization are reflected in the conduct of the assignment |
| **5. Manage a lean assignment for a specific target business** | 5.1 Respond to a request for a pollution prevention or lean assignment | • The organization is identified, including the vision and mission statements, values and markets the organization services<br>• The services requested are identified and assessed as being within the competence of the practitioner<br>• Need for a nondisclosure agreement is determined<br>• Special requirements for insurance and site health and safety are determined |
| | 5.2 Create proposal for the pollution prevention or lean assignment | • An outline supporting the strategy for each service is provided. The strategy should state how the service is to be delivered, what objectives will be achieved and the proposed timeframe. The timeframe for service delivery must |

# COMPETENCY TABLE

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| | | be realistic and reflect the ability of the practitioner to provide the service and achieve the objectives. Coordination of each strategy; meetings, phasing, timing, etc. must accord to the key timeframe. Key performance outcomes should be established and stated. Objectives must be measurable. Fee for services (if applicable) must include the costing rationale.<br>• The practitioners profile should include: personal particulars and contact details; competence to provide the services including knowledge, skill, experience and personal attributes specific to the requirement; insurance details; reflect effective language without grammar, spelling or typographical errors; and the information presented shall be accurate. |
| | 5.3 Communicate with the senior management at the commencement of the assignment | • An opening meeting should seek to inform the senior management of the business regarding the nature of the planned on site visit and to obtain their input to the planned work<br>• The presentation should highlight the key considerations, flow logically, facilitate and support the |

# COMPETENCY TABLE

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| | | proposal and be easy to understand and respond to. The key considerations will include: assumptions/background; objectives and KPIs; supporting strategies; timeframe; coordination and administration.<br>• The practitioner should be capable of discussing the engagement in terms familiar to senior management. |
| | 5.4 Deliver the service to specifications | • The practitioner must be able to deliver to the written project plan that describes the outcome/deliverables of the service outlined in the proposal and to measure the outcomes.<br>• The written project plan must be expressed in language/terminology that is commonly understood by the target business' managers and staff.<br>• The service objectives must be measurable and reflect the risks identified in the risk audit<br>• There must be a supporting service delivery strategy (defining how the service is to be delivered effectively and within the prescribed timeframe) for each service objective |

# COMPETENCY TABLE

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| | | • KPO/KPI must be stated and reflect measurable achievements<br>• The timeframe and phasing must be realistic and reflect the ability of the practitioner and the organization to achieve the service outcomes |
| | 5.5 Involve the ***employees*** in the delivery of the service | • The practitioner must have a plan to involve the employees in the planning and implementation of the planned work at the facility<br>• The practitioner must have knowledge of a range of employee involvement methods and the ability to determine which would work best under different situations |
| | 5.6 Address the issue of the resistance to change | • Prepare a plan of action that will address the need for change and the actions required to manage/resolve resistance from the internal stakeholders<br>• The practitioner must address the target's need to improve organizational performance<br>• The practitioner must provide an overview of the business plan and key outcomes, specifically the outcomes required of the current |

# COMPETENCY TABLE

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| | | intervention<br>• State the target's course of action including training, reallocation of duties, etc.<br>• State the potential for redundancy<br>• Be able to provide for an open discussion of questions and follow up to provide answers when they are not immediately known |
| | 5.7 Write a risk management plan | • Be familiar with an established risk management standard (e.g., AS 4360) and its application to the target business/industry sector<br>• The identified risks must be as a result of a risk identification effort and reflect the risk to the organization of not achieving the objectives prescribed in the proposed effort<br>• A risk management plan should cover the timeframe, identify the risk and allow for treatment of the risk within the timeframe covered in the proposal |
| | 5.8 Manage target relationships | • Establish a communication file containing contact details and other data necessary to maintain and manage a target's relationship<br>• Communication reflects effective language |

# COMPETENCY TABLE

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| | | • Data is used in a manner that promotes an ongoing relationship with the target and supports good business practices<br>• See that the target is protected in accordance with appropriate legislation and practice (i.e., confidentiality, conflict of interest, and intellectual property protection) |

# KNOWLEDGE

## Knowledge Introduction

Every pollution prevention (P2) and lean practitioner needs to have sufficient knowledge for the assignment. This knowledge is obtained both formally through courses and other educational activity and less formally through experience and reading. Many certification providers specify the specific knowledge that is desired. In some cases, the knowledge requirements are divided into application categories. For example, the Society of Manufacturing Engineers has bronze, silver, and gold requirements for lean knowledge.

The bronze certification category is focused on "tactical lean" – the deployment and application of lean principles, concepts and methods locally, within a work group or value stream. Silver is focused on "integrative lean" – the integration of lean activities, coupled with organizational restructuring necessary for the transformation and sustainable lean operation of a complete value stream. Gold is focused on "strategic lean" – the transformation of a business or organization. This category requires that the applicant have demonstrated at least two business transformation projects conducted as a silver certified lean practitioner.

These categories are instructive because they tell us that we expect different things from different P2 and lean practitioners. The RABQSA has internal auditors, third party auditors and lead auditors. Each has different knowledge requirements.

It was beyond the scope of this project to assign P2 and lean practitioner assignment categories and assign a level of knowledge to each. The SME effort involved more than 300 people followed by sufficient vetting of the findings before the program was implemented. The Green Suppliers Network and perhaps the State of Michigan may wish to determine what knowledge is required for a practitioner that is supervised on the job and a lead practitioner on a specific assignment. There should also be the strategic level where a practitioner strategically works with the company to scope the assignment and evaluate the outcomes of the engagement so that the client can have the best possible advice and recommendations.

There is a second consideration for knowledge. When an assignment is being scoped, it is important that the evaluation of the needs is examined in a systematic fashion. The P2 or lean practitioner should have what is referred to as a "body of knowledge" (BOK) to work with. Figure 1 provides an example of a BOK for quality. The American Society of Quality has

organized BOK's for all of its certification categories. In addition, the Project Management Institute has used a BOK as the basis for its certification program.

A P2 or lean practitioner would maintain a BOK in a library or some form of electronic database. During the preparation of an assignment, this database would be utilized. Through proper preparation better questions can be asked prior to and during the assignment. This will contribute to a more positive outcome for the client. Let's take a look at typical knowledge requirements for both pollution prevention and lean.

## Pollution Prevention Knowledge

From an informal survey of fifteen pollution prevention experts, the following knowledge categories were identified:

- Basis knowledge of chemistry, mathematics, business economics, basis industrial processes, and organizational behavior
- Environmental and P2 terminology
- P2 principles (source reduction and waste management hierarchy) and how they compare and contrast with other sound environmental practices (e.g., recycling, waste minimization, waste-to-energy, etc.)
- Environmental management principles and their application – especially the use of the Plan-Do-Check-Act Cycle and the means for using environmental management systems to drive P2 into the way the business is managed
- Basic knowledge of environmental legislation and rules and regulations
- Basic knowledge of the concept of continual improvement and process improvement methods (e.g., lean, six sigma, Systems Approach, TQM, etc.)
- Incorporation of P2 into environmental regulations and standards
- Environmental management tools including root cause analysis, option selection and prioritization and the preparation of action plans
- Applying P2 tools at a tactical level and integrating tools into a systems view of the process
- Sector-specific process understanding and terminology using P2 "Body of Knowledge"
- Research ability for learning about new process and P2 option information
- Knowledge of material substitution basics and issues
- Process mapping and reading of process and engineering drawings
- Environmental aspects and impacts (inputs and outputs)
- Methods for risk management and ability of P2 to treat the identified risks
- Legal and other requirements for environmental management
- Critical characteristics of operational processes and supporting processes
- Monitoring and measurement techniques
- Ability to make quantitative measurements of resource reduction potential
- Technologies for pollution prevention
- Benchmarking

## Lean Knowledge

The lean knowledge requirements are derived principly from the SME "Lean Certification Body of Knowledge."

### Core Operations and Processes

- Systematic identification and elimination of waste
    - Waste identification and elimination
    - Value Stream Mapping
    - Value analysis
    - 5S standards
    - Visual workplace
    - Kaizen and Kaizen Blitz events
    - Mistake proofing (Poka-Yoke)
    - Continuous improvement (kaizen)
- Just-in-Time Operations
    - Takt time
    - Material signals (Kanban)
    - Pull systems
    - Continuous flow
    - Junt-in-time (JIT)
    - Quick changeover/set-up reduction (SMED)
    - Total productive/preventive/predictive maintenance (TPM)
- Cellular and Continuous Flow
    - Cellular manufacturing
    - One piece flow
    - Standard work (operating instructions)
    - Multi-process handling
    - Autonomation (Jidoka)
    - Production schedule
    - Bills of material
    - Routings
    - Flow analysis charts

### Business Operations – Vision and Strategy

- Operational processes vision, mission, strategies, objectives and targets (goals)
- Lean principles in strategy
- Employee empowerment in strategy
- Operational alignment with organizational vision and strategy

### Innovations in Product Design and Market Service

- Product Design and development of products and services

    - Quality function deployment
    - Concurrent or simultaneous engineering
    - Variety reduction
    - Engineering changes
    - Design for manufacture and assembly
    - Design for product life cycle (cradle to cradle)
    - Design for environment
    - Failure mode and effects analysis
    - Life cycle engineering
    - Production process preparation
    - Knowledge transfer methods and practices
- Product market service
    - Customer feedback and market needs analysis
    - Customer specifications and requirements
    - New market development and current market exploitation
    - E-commerce systems
    - Benchmarking

**Suppliers, Customers and Other Stakeholders (Relationship Development)**

- Suppliers
    - Supplier development processes
    - Supplier certification
    - Supplier benchmarking
    - Supplier satisfaction measurement
    - Corrective action system
- Customers
    - Customer training and development process
    - Customer selection and focus
    - Demand load leveling
    - Corrective action system
- Distribution and transport logistics
    - Warehousing
    - Distribution centers
    - Revere logistic (returns, dunnage, etc.)
    - Remanufacturing/maintenance, repair and overhaul
    - Just-in-time alliances
    - Supplier managed inventory systems
- Other stakeholders
    - Stakeholder engagement methods
    - Stakeholder satisfaction measurement
    - Corrective action system

**Alignment and Systematic Business and Service Process Design – Support Functions**

- Finance and accounting
- Human resources
- Materials management
- Information technology
- Sales and marketing
- Quality assurance
- Process and manufacturing
- Legal and Regulatory
- Environment, health and safety
- Purchasing
- Logistics

**Quality, Cost and Delivery Measurement**

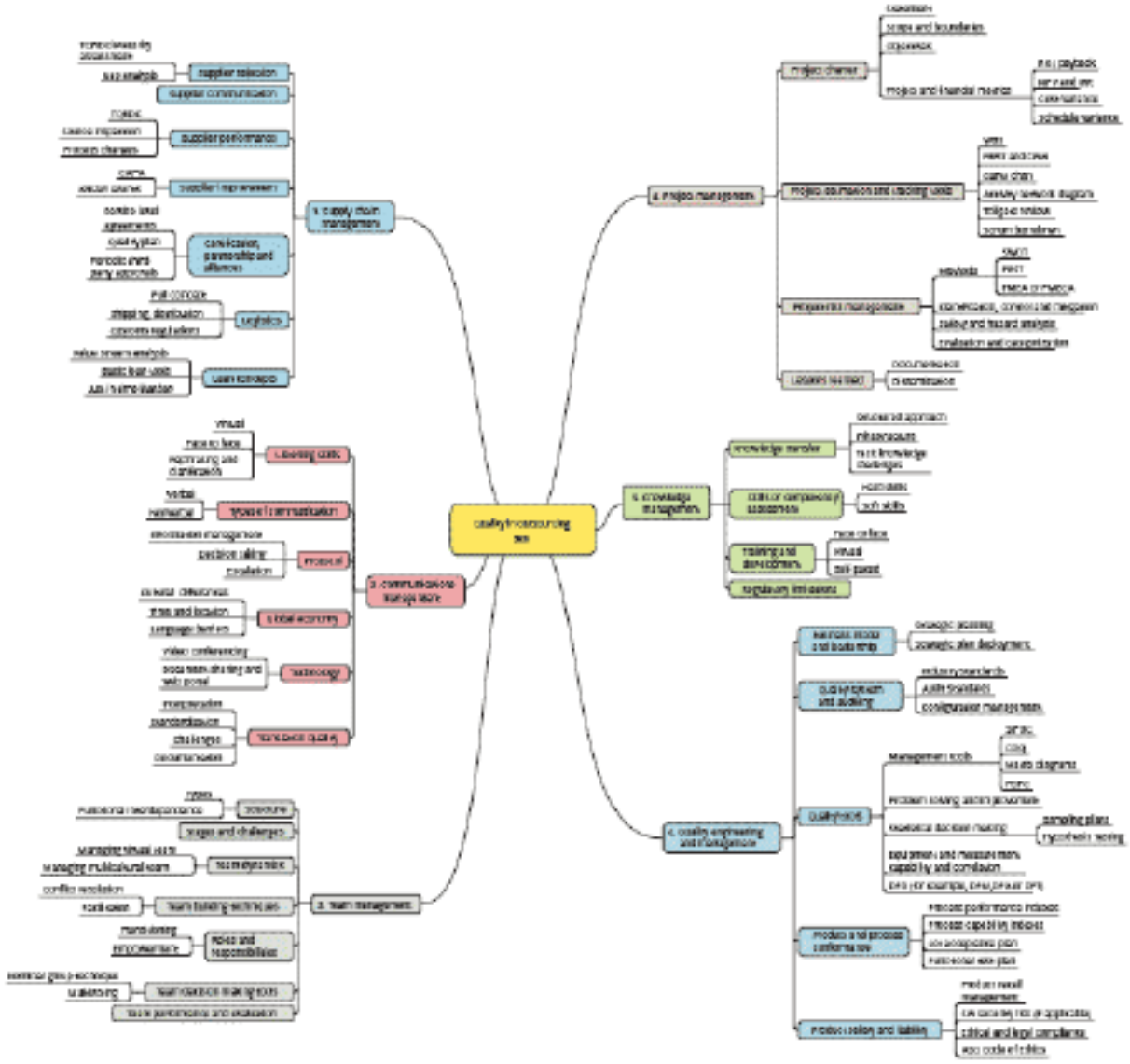
- Quality and Quality Improvement
    - Rework
    - Customer rejects
    - First pass yield
    - Scrap
    - Process variation
    - Cost of quality
    - Warranty costs
- Cost and Productivity Improvement
    - Inventory turns
    - Record accuracy
    - Cycle time
    - Operational equipment effectiveness
    - Labor value added
    - Product cost reduction
    - Changeover
    - Resource utilization
    - Energy efficiency
    - Performance to load leveling
- Delivery and Customer Service Improvement
    - Line items delivered on-time to customer requirements
    - Complete orders delivered on-time to customer requirements
    - Customer lead time
    - Premium freight
    - Mistakes in shipments
    - Warranty response, service, etc.

**Business Results**

- Customer Satisfaction
    - Operating income on sales and assets

    - Operating income on space
    - Fixed and variable costs
- Business Results
    - Cash flow
    - Value stream profitability

**Quality in outsourcing BoK—expanded** / FIGURE 1



# SKILLS

## Skills Introduction

Many people equate competency with knowledge. However, it requires some skill to use the knowledge effectively. Many educational professionals state that skills are best learned in practice. Employers want people to already have the skill to use the education when they are hired. Competency-based training provides an effective means of both providing skills and helping supplement the knowledge. Sometimes it is difficult to separate the skill from the knowledge. They are often combined in some of the references.

In the section below, the skills mentioned by a poll of fifteen pollution prevention experts is provided. The lean practitioners will need similar skills. Some additional skills are provided in the following section as taken from some of the certification documents. The competency user needs to determine what skills are needed for different levels of assignment as mentioned in the knowledge section.

### P2 Practitioner Skills

Understand the use of P2 principles, procedures and techniques to enable the P2 practitioner to *apply* those appropriate to different assignments and ensure that the assignments are conducted in a consistent and systematic manner. A P2 practitioner should be able to:

- apply P2 principles, procedures and techniques
- plan and organize the assignment effectively
- understand current knowledge at facility and build from this point
- compare process information from assignment preparation to the information provided by the client
- ability to maintain a systems approach to P2 evaluation (everything is linked to everything else)
- conduct the assignment within the agreed time schedule
- prioritize and focus on matters of significance
- collect information through effective interviewing, listening, observing and reviewing documents, records and data
- conduct interviews and involve employees – get ideas and support for P2
- understand the appropriateness and consequences of using knowledge of the industry for sampling of areas to focus on

- analyze the data obtained during the assignment and compare it to information in the P2 "Body of Knowledge" to inform proper decision-making
- verify the accuracy of collected process information
- confirm the sufficiency and appropriateness of evidence to support assignment findings and conclusions
- keep records of all assignment activities and findings
- prepare P2 findings reports
- maintain the confidentiality and security of information, and
- communicate effectively with workers, either through personal linguistic skills or through an interpreter
- communicate effectively with management, government, stakeholders and technical experts using their technical language
- integrate P2 with other methodologies including six sigma, lean, TQM, CQI, etc.
- integrate P2 with other programs including sustainability, corporate social responsibility, integrated management systems, and business excellence frameworks.

Use P2 "Body of Knowledge" base and reference documents on the processes covered in the assignment: to enable the P2 practitioner to comprehend the scope of the assignment and *apply* P2 knowledge to the host company. Skills in this area should cover:

- application of pollution prevention knowledge to different organizations
- interaction between the core processes and supporting processes
- recognizing differences between and priority of different reference documents
- application of the reference documents to different assignment situations
- information systems and technology for authorization ,security, distribution, and control of documents, data and record
- creating financial numbers for different P2 options
- using the organization's risk management approach to determine the proper treatment of risk
- tracking outcomes to evaluate the success of the assignment
- considering the cost effectiveness of the recommendations
- knowledge of local/regional vendors to facility P2 options

Organizational situations: to enable the P2 practitioner to comprehend the organization's operational context. Skills in this area should cover:

- organizational size, structure, functions and relationships
- general business processes and related terminology
- knowledge of business systems to tailor the recommendations to best utilize existing capacity to manage implementation and sustain program
- empowerment of employees and suppliers (if applicable)
- evaluating human capabilities for P2 options
- ability to navigate the organization's political situation
- cultural and social customs of the organization and the workers.

Assignment P2 team leaders should have additional knowledge and skills in assignment leadership to facilitate the efficient and effective conduct of the assignment. A team leader should be able to:

- plan the assignment and make effective use of resources during the assignment
- strategy of the P2 assignment
- represent the P2 team in communications with the client
- organize and direct P2 practitioners
- provide direction and guidance to P2 practitioners-in-training
- lead the P2 team to reach conclusions
- understand organizational dynamics
- prevent and resolve conflicts
- prepare and complete the final assignment report
- influencing the organization to move forward with P2 options
- planning P2 workshops and events
- providing mentoring and coaching

**Other Skills Mentioned in Lean References**

Lean practitioners need to know how to use quality tools for delivering continuous improvement.

- Plan-Do-Check-Act (PDCA) (DMAIC)
- Reliability and maintainability methods
- Root cause and corrective action methods
- Flow charting and process mapping
- Pareto analysis (80/20 rule)
- Cause and effect diagramming
- Check sheet, histograms, and scatter and concentration diagrams
- Team leading skills
- Mentoring skills

Many of these quality tools are discussed in the US Environmental Protection Agency publication, “An Organizational Guide to Pollution Prevention.”

# ATTRIBUTES

## Attributes Introduction

Attributes are the behavioral component of the Knowledge-Skill-Attribute (KSA) triad found in all competency determinations. When working as a P2 or Lean Practitioner, it is important to monitor one's attributes. This will help the practitioner perform better. It is not necessary to demonstrate all of the attributes all of the time. However, the most successful practitioners will clearly demonstrate most of them much of the time. Certification bodies (RABQSA) test for attributes using examinations that pose certain situations and measure the response of the person to those situations.

Here are some of the attributes that show up in the competency literature:

- **Ethical –** fair, truthful, sincere, honest and discreet
- **Open-minded** – willing to consider alternative ideas or points of view; be inquisitive and ask a lot of questions; listens well
- **Proactive and organized** – takes the initiative with issues and is personally organized
- **Systematic** – shows a balanced affiliation for both tasks and people
- **Logical** – makes decisions based on facts and reasoned logic
- **Decisive** – reaches timely conclusions based on logical reasoning and analysis; expedites decisions methodically
- **Diplomatic** – relates to others and shows tact in appropriate situations
- **Observant** – shows the ability to identify both patterns and exceptions in complex situations; actively aware of physical surroundings and activities
- **Perceptive** – instinctively aware of and able to understand situations
- **Flexible** – shows a balanced global and detail focus
- **Process focused**- demonstrates the ability to follow a pre-determined method; sees the interconnections between core product and service processes and the host of supporting processes
- **People sensitive** – is sensitive to and can identify a person's emotional state
- **Versatile** – adjusts readily to different situations
- **Tenacious –** persistent, focused on achieving results
- **Self-reliant –** acts and functions independently while interacting effectively with different types of people in a range of situations and copes with change

- **Confident** – demonstrates certainty and competency and reacts well to a variety of challenges demonstrating calm and poise in such challenging situations.

# Pollution Prevention: Graduating to Competency-Based Training

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## Introduction

For the past twenty years, new pollution prevention (P2) facilitators have been trained using traditional methods. This training was designed to help them understand what they needed to know. P2 trainers relied on the many excellent databases available on the Internet that contain success stories and anecdotal information. For the most part, these new facilitators learned about material substitutions and P2 technology diffusion.

More recently, P2 trainers seek to include some level of skill development. The US Environmental Protection Agency publication, "An Organizational Guide to Pollution Prevention," presented information about process mapping, the Systems Approach, environmental management systems, and basic problem solving tools including root cause analysis. People have to realize that it takes time and experience to develop skills. The rush to get the P2 facilitators in the field often is at odds with skill-based training. Traditional P2 training is often ineffective when the goal is to train individuals to perform specific job-related skills.

There have been other problems with traditional P2 training. With its focus on success stories, new trainees do not learn that chemical substitutes that remove the threat of carcinogenicity may be flammable or cause severe allergies with the people who use them. New technologies create problems with the process since they are not properly introduced with a "systems" view. There is little realization that "everything is connected to everything else." Unwittingly, the P2 training is encouraging the focus to shift from environmental problems to health and safety problems which create process upsets elsewhere in the system. These problems point out the importance of grounding the training in the real world where P2 is applied.

One way to improve the quality of the training of P2 facilitators is to move to a technique known as "competency-based training" (CBT). This approach to training is a system that measures success through mastery of specific knowledge and the skills to use that knowledge. While traditional, time-based approaches are instructor-based, the CBT approach is conversely a participant-centered approach. Although each approach to P2 training has its proper place in a facilitator's learning pathway, CBT appears to offer some significant advantages in the area of P2 training.

## What is CBT?

Competency-based training is a participative method of training. It does not feature a lot of lectures. Focused exercises are used to develop knowledge and skills. There is continual feedback being provided by the CBT instructor to the candidate. There is no grading in competency-based training. Participants are examined as either "competent" or "not yet competent." There are no failing grades. Someone who is "not yet competent" will be provided with a "learning pathway" by the CBT instructor in order to provide more evidence or more assessment opportunity until the candidate achieves competency (ability to perform the task). The CBT instructor keeps working with the candidate until the required skill can be demonstrated. This is very much like apprenticeship programs of the past.

It is important that CBT be adequately prepared. An organization known as RABQSA[1] is a leading promoter of CBT and has a very informative web site with guidance for preparing these training programs. The steps in preparing a CBT training program include the following:

- P2 competencies are selected carefully
- Supporting P2 theory is integrated with skill practice
- Essential knowledge is learned to support the performance of skills
- Detailed training materials are keyed to the competencies to be achieved and are designed to support the acquisition of knowledge and skills
- Methods of instruction involve mastery learning - all participants can master the required knowledge or skill, provided sufficient time and appropriate training methods are used
- Participants' knowledge and skills are assessed as they enter the program and those with satisfactory knowledge and skills may bypass training or competencies already attained
- Flexible training approaches including large group methods, small group activities and individual study are used

- A variety of support materials including print, audiovisual and simulations keyed to the skills being mastered are available
- Satisfactory completion of training is based on achievement of all specified competencies.

Many countries operate their entire education system using CBT. However here in the United States, the traditional education model rules. RABQSA certifies CBT courses and instructors for quality and environmental management systems. The CBT techniques work quite well for P2 facilitator training as well.

## Defining Competency

One of the documents included in the RABQSA CBT courses is entitled, "Guidelines for Quality and/or Environmental Management Systems Auditing[2]." It provides a reliable listing of the components that constitute competency (see Figure 1).

The P2 facilitator's knowledge will be defined by the individual competencies that the CBT training provider feels are important for successful work in this P2 discipline. It is important to note that unlike the case of the ISO quality and environmental management standards, no independent body has yet determined what the P2 facilitator skills should be. If one was to use the competencies for a RABQSA certified environmental management specialist as a guide, the P2 consultant would have to demonstrate competency in the following areas:

- Understand the application of P2 principles
- Understand the P2 needs of different operational processes
- Assess the risks with and without P2 actions
- Assess the effectiveness of P2 methodologies making sure there is no transfer of problems to other parts of the system of shifting an environmental problem for a health and safety problem
- Assess the P2 roles and responsibilities with the context of the organizational environment
- Assess the P2 projects in light of the overall business strategy
- Determine the adequacy and effectiveness of the overall P2 program.

A significant effort is required to determine the competencies for a P2 facilitator. For each of the seven competencies listed here, a CBT training provider would have to determine the performance criteria that will be used to judge each of the competencies. The training providers would also have to prepare a listing of evidence that they will accept that demonstrates that a P2 facilitator is indeed competent. Figure 2 shows a representative table with an idea of how the information would be presented.

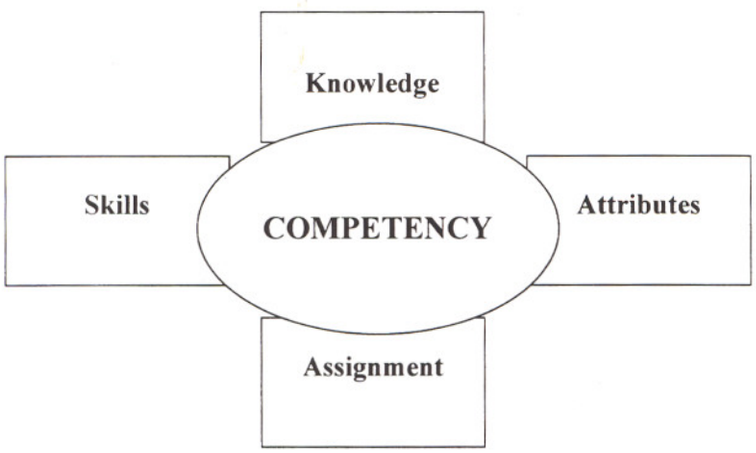


**Figure 1 - Elements that constitute the competency of a P2 facilitator.**

Failure to properly identify these knowledge competency elements and making them very clear at the outset will likely result in ineffective training. CBT trainers help the participants move down a learning pathway by observing their progress with exercises designed to develop the skills necessary to use the knowledge that is provided. It is important that the trainers be educated in CBT so that they will not revert to the traditional way of teaching and not adhere to the CBT model.

The CBT process should make P2 facilitators aware of how personal ***attributes*** enable them to be more effective in their role as a P2 facilitator. The P2 facilitator should be:

- Open-minded – willing to consider alternative ideas or operator views
- Diplomatic – tactful in dealing with the employees
- Observant – actively aware of physical surroundings and activities
- Perceptive – instinctively aware of and able to understand situations
- Versatile – adjusts readily to different situations
- Tenacious – persistent, focused on achieving objectives
- Decisive – reaches timely conclusions based on logical reasoning and analysis
- Self-reliant – acts and functions independently while interacting effectively with others
- Able to see opportunities rather than threats.

Many of these attributes are commonly found as selection criteria for P2 facilitator positions. Even with very little experience in the P2 facilitation field, it is easy to see the importance of these attributes. They enable the P2 facilitator to work effectively with employees and the management representatives in the organization. Not everyone will have all these attributes. However, they must be aware that these attributes will help them be more successful when working on P2 assignments.

| Competency | Performance Criteria | Evidence Guide |
|---|---|---|
| 1: Understand the application of the principles, procedures and techniques of auditing | 1.1: The principles, objectives and techniques of auditing management systems, as outlined in ISO 19011:2002, are understood and applied. | In accordance with ISO 19011:2002 guidelines, with omission or deviation justified<br>Presented verbally, written or other via means; accurate, concise and within context.<br>The evidence of 'understanding' must be measurable and relate directly to the requirements of the Standard.<br>********** |
| | 1.2: The terms and definitions of ISO 19011:2002 are understood and applied. | Understanding of the auditing principles and practices as identified in ISO/IEC19011:2002 is demonstrated.<br>correct use of terms and definitions of IEC19011:2002 is demonstrated. |
| | 1.3: Audit criteria relevant to the auditee's business and operation are identified. | levant audit objectives, scope and criteria are accurately defined.<br>The issues affecting the feasibility of an audit such as information requirements, auditee co-operation, and resource availability are identified. |
| | 1.4: An audit plan is developed to meet the agreed audit criteria. | A document review within the audit criteria is conducted with omission or deviation justified and appropriate actions communicated to the auditee.<br>On-site audit activities are planned and a written audit plan is prepared, including an audit timetable that accurately reflects the achievement of the audit objectives within the agreed or prescribed timetable. |
| | 1.5: A document review is completed. | |
| | 1.6: All aspects of the on-site audit activities are understood and applied. | An audit checklist, or other relevant work documents, that conforms to the requirements of the reference standard is developed. |

TOPIC

STANDARD

**Figure 2 – Collation of Knowledge Competency Based on the RABQSA Model.**

It is important to consider the typical P2 ***assignments*** and determine how to prepare the P2 facilitator for this work. This specialist works closely with the organization's employees to identify, evaluate, recommend and assist in implementing source reduction practices that result in the elimination of waste, regulatory compliance requirements and unnecessary costs associated with the process prior to its improvement. Among the assignments are the following:

- Conducting process mapping with confirming facility assessments
- Verifying information with employees and seeking their opinions on opportunities to improve the processes
- Involving management in the prioritization of opportunities to improve the process
- Facilitating employee team P2 projects using root cause analysis, brainwriting of potential P2 alternatives, bubble sorting to prioritize the alternatives and the preparation of an action plan for management review and implementation
- Researching existing and new technologies to supplement the knowledge of the employees and management in the facility
- Coordinating P2 awareness activities
- Ensuring regulatory compliance
- Establishing partnerships and building a strong P2 program
- Measuring P2 program effectiveness and contribution of value to the organization
- Fulfilling administrative responsibilities to sustain the P2 program.

A P2 facilitator should have the following ***skills***:

- Apply P2 principles, procedures and techniques
- Plan and organize the P2 assessment and program effectively
- Prioritize and focus on matters of significance
- Collect process and input/output information through process mapping and resource accounting
- Interview, listen, and observe the people involved with the process
- Review documents, records and data
- Understand the appropriateness and consequence of stepping out of their facilitation role
- Verify the accuracy of collected information
- Confirm the sufficiency and appropriateness of the information and other best practice information
- Assess those factors that can affect the reliability of the P2 projects
- Maintain the confidentiality and security of information
- Communicate effectively.

Most of these are skills which need to be developed during the CBT efforts.

## Advantages of CBT

One of the advantages of CBT is that the focus of the training is on the success of each P2 facilitator enrolled in the class. It is particularly useful when the training participants already have some knowledge of P2. Information is readily available on a variety of different P2 web sites. The key benefits of CBT include:

- Participants will achieve competency required in the performance of their P2 facilitation activities
- Participants build their confidence as they succeed in mastering specific competencies
- Participants can receive a transcript that lists the specific competencies that they have achieved through the training
- Training time is used more efficiently and effectively as the trainer is a guide to learning as opposed to a provider of information
- Much more of the time is devoted to working with the course participants individually or in small groups as opposed to presenting lectures
- More training time is devoted to evaluating each participant's ability to perform essential job skills

- Participants become aware of the attributes and skills that will help them perform their P2 facilitation with greater ease and effectiveness.

An effective P2 program helps the organization meet its commitment to "the prevention of pollution" in its environmental management system. This program is a key to the effective operation of the preventive action program and the ability to continually improve with clear financial value through this preventive approach.

In a business sustainability program, P2 is usually called "eco-efficiency" or "cleaner production." The stakeholder perspective is included when prioritizing the environmental aspects and impacts. Much of the program's focus on prevention is a result of a strong P2 facilitator turned sustainability facilitator.

## CBT in the Real World

You can tell from the number of bullet points in this article that CBT is not for the faint at heart. While the financial value contribution from an effective P2 program makes the investment in CBT worthwhile in most cases, there are some limitations that need to be considered.

A CBT course is only as effective as the process used to identify the competencies. When little or no attention is given to identification of the essential job skills, attributes and assignment, then the resultant training course is likely to be ineffective. A professional association like the National Pollution Prevention Roundtable (NPPR) can take the lead in creating P2 facilitator competencies using the RABQSA model as a guide.

There are some P2 training courses that may be classified as competency-based, but unless specific CBT materials and training approaches are present (i.e., competency charts, learning guides, and a CBT trained instructor), it is unlikely that the resulting course will be truly competency-based. The organization that establishes the competencies needs to effectively manage these worrisome market issues.

Many blame the downturn in P2 interest on the fact that the so called, "low hanging fruit" is gone. It is now hard work to be involved in P2. This is precisely the reason CBT is needed. If people thought P2 was difficult, wait until they seek to help an organization move down the path to business sustainability. But there are ways to make the process work better. P2 facilitators can participate in what is referred to as "blended learning." Face to face CBT training would be supplemented by e-learning models offered through a web site. The participants would work on independent projects and interact with the CBT instructor and perhaps other classmates using on-line discussion board tools.

Many of the environmental and quality management system auditors have been trained using CBT. They may already have some P2 facilitator experience. In this case, a program known as "Recognition of Prior Learning" (RPL) can be used to allow the candidates to receive credit for the competencies and skills they can demonstrate using the evidence in the table presented in Figure 2. When accepted by the CBT trainer, some of the training can be waived.

It would not be difficult to have an experienced CBT training organization create a similar program for P2 facilitators and business sustainability facilitators. P2 technical assistance programs and industries that use P2 to continually improve their processes can work through a professional organization like the NPPR to start down this path. With the increased demands of business sustainability, it would make a lot of sense for the P2 community to prepare for these new challenges.

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## References

1 RABQSA Web Site. Retrieved October 5, 2007, at http://www.rabqsa.com/index.html

2 International Organization for Standardization (2003). ISO 19011, Geneva, Switzerland: ISO Press.

# COMPETENCY-BASED TRAINING

## Competency-Based Training Introduction

It is difficult to have a discussion on competency without discussing competency-based training (CBT). We are all used of time-based traditional training. Students get a metered amount of information in specific period of time. They get a grade and either pass the course or fail the course and have to repeat it. The previous section outlines the nature of CBT. This section provides more information on how it can be used by the sponsoring organizations.

## Developing Competency-Based Training

There are three steps to developing CBT:

1. Identify the specific competencies practitioners need to demonstrate at the completion of training that will benefit the goals of the program;
2. Determine the performance criteria that constitute the competency. The performance criteria are a combination of actions (resulting from possession of skills/abilities and attributes) and knowledge, which are necessary to demonstrate achievement of the competency. They act as the specific standards for the CBT. The performance criteria can be found in the competency table presented in this report.
3. Observe the practitioner demonstrating the competency or producing evidence of the competency during either the CBT or RPL event. The evidence guide specifies practical examples of how this should be demonstrated.

CBT uses interactive exercises that enables the CBT-trained instructor or observe the participants in the training course. Some students may wish to demonstrate the KSA's that they have prior to taking the CBT course. This is called, Recognition of Prior Learning (RPL), and is described below. These offer the two routes to demonstrating competencies to a third party. An individual can use the model to have colleagues observe them in practice. This is referred to as "on-the-job" learning. It would be possible for practitioners to develop and demonstrate competency in this alternative approach. There is no critical requirement for creating a CBT system. However, many organizations do so to speed the development of the practitioners and help them better understand and use the skills necessary to be successful on lean and pollution prevention assignments.

## Essential Elements of a CBT System

There are seven (7) essential elements of a CBT System:

1. Competencies to be achieved are carefully identified, verified and made public in advance of the CBT course or RPL evaluation.
2. Criteria to be used in assessing achievement and the conditions under which achievement will be assessed are explicitly stated and made public in advance.
3. The instructional (CBT) program provides for the individual development and evaluation of each of the competencies specified.
4. Assessment of competency takes the participant's knowledge and aptitudes into account but requires actual performance of the competency as the primary source of evidence.
5. Participants progress through the instructional program to demonstrate the attainment of the specified competencies.
6. The trained CBT evaluator deems the participant to be "*competent*" or "*not yet competent*" for each of the performance criteria in the competency table.
7. Participants that are unable to demonstrate competency in the CBT or RPL evaluations, are provided with a "learning pathway" and assigned an activity that will help them fulfill the requirements of the performance criteria in question. They will have 12 months to complete the learning pathway to the satisfaction of the trained examiner.

Since this contract did not include defining the CBT, no additional detail is provided here. It is a significant effort to establish a CBT system for a program. Traditional trainers generally have difficulty switching to CBT instructors. There is also a lot of administration required to operate the CBT, the RPL and the status of the learning pathways.

## Key Characteristics of CBT

The key characteristics of competency-based programs are as follows:

- Competencies are carefully selected
- Supporting theory is integrated with skill and practice. Essential knowledge is learned to support the performance of skills
- Detailed training materials are keyed to the competencies to be achieved and are designed to support the acquisition of knowledge and skills
- Methods of instruction involve mastery learning, the premise that all participants can master the required knowledge or skill, provided sufficient time and appropriate training methods are used
- Participants' knowledge and skills are assessed as they enter the program and those with satisfactory knowledge and skills may bypass training or competencies already attained (see RPL below)
- Learning should be self-paced
- Flexible training approaches include large group methods, small group activities and individual study are essential components

- A variety of support materials including print, audiovisual and simulations keyed to the skills be mastered are used
- Satisfactory completion of training is based on achievement of all specified competencies
- Trainers must themselves be trained to conduct competency-based training courses and observed by independent trainers to be deemed competent.

## Recognition of Prior Learning (RPL)

RPL is an alternative examination pathway to attainment of competency, just like attending a CBT course. In the RPL process, the practitioner is stating they already have the knowledge, skills and attributes for the units of competency through prior learning, formal training, and work experience.

RPL candidates should not be attending a CBT course that covers the learning of those units of competency until their RPL application has been finalized and evaluated by an independent, trained examiner. As with the CBT, the examiner will deem the practitioner to be "***competent***" or "***not yet competent***" in each of the areas covered in the competency table.

## Advantages and Limitations of CBT

One of the primary advantages of CBT is that the focus is on the success of each lean or pollution prevention practitioner. The benefits of CBT include:

- Participants will achieve competencies required in the performance of their jobs
- Participants build confidence as they succeed in mastering specific competencies
- Participants receive a transcript or list of the competencies they have achieved
- Training time is used more efficiently and effectively as the trainer is a facilitator of learning as opposed to a provider of information
- More training time is devoted to working with participants individually or in small groups as opposed to presenting lectures
- More training time is devoted to evaluating each participant's ability to perform essential job skills.

While there are a number of important advantages of CBT, there are also some limitations:

- Unless initial training and follow-up assistance is provided for the CBT trainers, there is a pronounced tendency to "teach as we were taught" and CBT trainers could quickly slip back into the role of the "traditional" (i.e., not CBT) teacher
- A CBT course is only as effective as the process used to identify the competencies. When little or no attention is given to identification of the essential job skills and attributes of the practitioner, then the resulting training course is likely to be ineffective
- A course may be classified as competency-based, but unless specific CBT materials and training approaches (e.g., learning guides, checklists and coaching) are designed for use

as part of a CBT approach, it is unlikely that the resulting course will be truly competency-based.

The supporting organizations need to determine the need to develop and implement a CBT system to help improve the competencies of the pollution prevention and lean practitioners. It is not likely that they could avoid offering some kinds of skill trainings and making the practitioners more aware of the need to maintain a systematic body of knowledge. The more formal aspects of CBT are more likely to be required when there is some form of certification needed to improve the program.

State of Michigan
Department of Environmental Quality

EXERCISE #1

# USING A BODY OF KNOWLEDGE TO PLAN A LEAN/POLLUTION PREVENTION ASSIGNMENT

**Part 1.** You are preparing for an assignment to facilitate process improvement at a facility assembles outboard motors for pleasure boats. Describe how you would use your lean/pollution prevention "Body of Knowledge" (BOK) to understand their process. What information is in your BOK? How do you use the BOK ***systematically*** to help prepare for such an assignment? Please take 10 minutes to complete **Table 1** that describes your BOK. Spend 10 minutes discussing the BOK with your partner.

**Part 2**. To ensure your success in this assignment, you must invest time in planning the assignment. The management wishes to evaluate the performance of the assembly process. No detailed monitoring has been performed, but they know that the number of engines assembled per hour has decreased. Please take 15 minutes to complete the information in **Table 2** with your partner.

**Competency Being Measured:**

**1. Understand and have access to the lean/pollution prevention (P2) "body of knowledge.**
The P2 "body of knowledge" can be accessed and understood.

**2. Demonstrate the *skills* to use P2 knowledge during project assignments**
2.3 Demonstration of the effectiveness of P2 activities listed in Item 1.

**5. Manage a lean/P2 assignment for a specific target business**
5.1 Respond to a request for lean/P2 assignment
5.2 Create proposal for the lean/P2 assignment

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FIRST ENVIRONMENT

**Table 1. My BOK for Lean/Pollution Prevention**

| KNOWLEDGE AREA | SOURCES |
|---|---|
| | |
| | |
| | |
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| | |

Table 2. Proposed Work Steps, Objectives, Information Required

| WORK STEP | OBJECTIVE | INFORMATION REQUIRED |
|---|---|---|
| | | |
| | | |
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| | | |
| | | |
| | | |
| | | |

**NOTES**

# Preparing for an Assignment

Lean/P2 Competency Workshop

Grand Rapids, Michigan

September 8, 2008

Robert B. Pojasek, Ph.D.

FIRST ENVIRONMENT

SRG Sustainable Research Group

# Obtain Background Information

- Use “Body of Knowledge”
- Information sent by client
- Project files

# What is a “Body of Knowledge?”

A body of knowledge is a term used to represent the sum total of all knowledge in an area expertise, most notably professional bodies like project managers

The PMBOK® contains nine knowledge areas with the processes that need to be accomplished within its discipline in order to achieve effective project management

# Body of Knowledge

- Defines the knowledge underlying the practice
- Describes and provides methods, knowledge, and skills that are important to practitioners
- Promotes the advancement, understanding, and recognition of the practice among those who interact with the practitioners
- Facilitate professional development for practitioners at any stage of their career

# Body of Knowledge (cont.)

- Provides the basis for future curriculum development and self study
- Provides support for professional development and any future certification schemes
- Promotes integration and connections with related disciplines (lean-to-green)

# Lean Body of Knowledge

- SME has a lean certification as a standard against which professional lean competencies are measured
- The lean certification is based on the Lean Body of Knowledge

http://www.sme.org/downloads/cert/lean/BOK.pdf

# Module 1. Enablers for Lean

- Leadership
  - Business vision, mission, values, strategies, goals
  - Respect for humanity and social responsibility
  - Long- and short-term planning
  - Principles of lean leadership
  - Lean corporate culture
- Empowerment and Human Development
  - Principles of empowerment
  - Employee training and development
  - Teamwork
  - Suggestion/Feedback/Appraisal System

# Other Modules

- Lean Core Operations (2)
- Business Core Operations (3)
- Quality, Cost & Delivery Measures (4)
- Business Results (5)

# Your Personal BOK

- Experience – Files
- Library
- Internet
- Database
- Network

Use of your personal Lean/P2 BOK enables you to systematically search for information to plan the assignment

# Use of the BOK

- Specific information on the potential client
  - Vision, mission, guiding principles
  - Business sector and markets
- Information on the business sector
  - Activities, products and services
  - Special requirements for risk management
  - Determine if within capability of practitioner

# Determine Objectives, Scope and Criteria

- Objectives can be clarified by stating as a *charge* – series of questions to be answered
- Scope defines the *boundaries* within which the assignment will be conducted
- Criteria are used to define the success of the results associated with the assignment

*Derive a preliminary approach to the assignment – making your case!*

# Prepare for Discussion With Client

- List of questions and need for additional information
- Refine the statement of the clients needs
- Determine the best approach that favors the competency of the practitioner(s)
- Look for *conventions* (national and local) that need to be addressed
- Determine the value proposition

# Confirm the ADRI

- Approach
- Deployment
- Results
- Improvement

*These are the key to success in any assignment!*

# EXERCISE #2

# CONDUCTING LEAN/P2 INTERVIEWS

**Part 1.** Working in pairs, brainstorm a list of characteristics one might see in a poor listener. For example, a poor listener does not make appropriate eye contact. A good listener puts the other person at ease. Allow 15 minutes to complete the exercise. Please use **Table 1.**

**Part 2.** This session will enable you to practice your interview skill and experience different interview styles. An interview is the prime source of information when working with employees assigned to a process. Practice is needed to find your own unique and effective style.

Working in pairs, you are required to conduct an interview to gain specific facts about the worker's job, role and organization (either use the outboard motor case OR answer with reference to your own organization).

1. Interview your partner for five (5) minutes, to obtain some knowledge of how he or she knows how the productivity of the assembly process is measured and how their effort affects productivity.
2. Having completed your interview, report back to the interviewer for two (2) minutes on how effective they were in their questioning (please use Table 2).
3. Repeat this exercise, swapping respective roles.

The Instructor will allow 20 minutes to complete this second part of the exercise.

**Competency Being Measured:**

**4. Demonstrate important communication skills for P2 practitioners**
Effective communication is practiced
Interview skills are used to effectively acquire information required for the P2 activity

**5. Manage a P2 assignment for a specific target business**
5.5 Involve the employees in the delivery of the service

**Attributes will be observed.**

**Table 1. Brainstorming of Listening Skills**

| Poor Listeners | Good Listeners |
|---|---|
| | |
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| | |
| | |

**Table 2. Interviewing Technique Grading Sheet**

| Competency | Competent | Not Yet Competent |
|---|---|---|
| 1. Encourage the interviewee to talk | | |
| 2. Listening actively to responses | | |
| 3. Providing appropriate feedback | | |
| 4. Keeping an open mind | | |
| 5. Using appropriate language | | |
| 6. Use of direct vs. indirect questions | | |
| 7. Correct use of open/closed questions | | |
| 8. Summarizing and closing interview appropriate | | |

**NOTES:**

# Process for Collecting Information

Lean/P2 Competency Workshop

Grand Rapids, Michigan

September 8, 2008

Robert B. Pojasek, Ph.D.

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# Sources of Information at Project Site

- Interviewing employees
- Observing activities, work environment and conditions
- Reviewing documents and records
- Reports from other sources such as customer feedback, supplier ratings, stakeholder comments

# Effective Communication

| | |
|---|---|
| You speak | 7% |
| They speak | 38% |
| Visual contact | 55% |
| TOTAL | 100% |

# Improving Your Interviewing Skills

- Select the right people
- Acknowledge different perceptions
- Develop mutual understanding
- Express rather than impress
- Look for the “total message”
- Timing is critical

# Questions Help To…

- Check understanding
- Focus attention
- Obtain evaluations
- Establish reasons
- Discover the source, explore resources
- Obtain feedback
- Follow up

# Effective Interview Process

A defined interview PROCESS is needed – key steps:

- Planning – *Key planning activities*
- Listening – *Asking questions*
- Collecting Information – *Documentation*
- Analyzing – *Organizing the data*
- Report Writing – *Summary of results*

# Planning the Interviews

- Determine who to speak to – ask the right questions to the right people
- Prepare key questions to ask - in advance
- Do research on the company or individual in advance - ask good questions
- Prepare needed documentation
- *Listening skills are critical*

# Listening Skills

- A good interview is vital for success
- Ask *open ended* questions to gather information
- Ask – Who, What, When, Where, Why?
- Practice ACTIVE LISTENING – listen to understand!
- Take great notes – keep good records.
- Make sure you ask questions one at a time
- Listen to the words spoken – do not fill in the gaps
- Write answers exactly as you hear them!

# More Listening Skills

- Maintain eye contact if it's a face to face interview
- For a phone interview – always listen more than 50% of the time
- Repeat questions if not understood – POLITELY
- Have friendly tone – SMILE
- Be careful of facial and body expressions
- Keep the interview to the point – do not waste time (yours and theirs)
- Say please and thank you!

# Collecting Information

- Take great notes – and a good deal of them!
- Write exactly what is said
- Document – who, what, when, where, why
- Record Sample – number of people chosen, number of documents reviewed
- Make sure your notes are legible and retrievable
- Make sure the notes follow a pattern

# Note Taking

- Taking notes and key documentation is a key to success
- Be able to transfer notes to report format
- Can be typed or hand written
- Keep them in one place
- Do not discard your notes – ever – you might need them at a later date

# Analyzing Information

- DEAL with the FACTS
- Source should always be retrievable and factual
- Source should always be verifiable based on DATA taken
- Analyze data for trends, summary point, key points
- No opinions
- Be able to prepare a summary and report

# Documentation

- Interview - Notes should be clear
- Reports should always quote a source
- Reports should be accurate, brief and easy to understand
- Summary should be compelling – so that the reader needs to read the information
- Reports should be professional and factual– no opinions
- Summary should be kept as a permanent record for later use

# Review of the Process

- Planning – *Key planning activities*
- Listening – *Asking questions*
- Collecting Information – *Documentation*
- Analyzing – *Organizing the data*
- Report writing – *Summary of results*

State of Michigan
Department of Environmental Quality

# AGENDA

## Defining Your Lean and Clean Workplace Competencies

Monday, September 8, 2008
Time: 8:00 am to 5:00 pm

### MORNING

| | |
|---|---|
| 7:30 am | Registration |
| 8:00 am | Introduction (Exercise) |
| 8:30 am | Michigan DEQ Welcome and Video |
| 9:00 am | Lean Practitioner Competency Table Discussion |
| 9:45 am | BREAK |
| 10:00 am | Pollution Prevention Practitioner Competency Table Discussion |
| 10:45 an | Creating a Body of Knowledge for Lean-to-Green Practitioners |
| 11:30 am | Summary Discussion on Competency |
| 12:00 noon | LUNCH |

### AFTERNOON

| | |
|---|---|
| 1:00 pm | Introduction to Competency-Based Training |
| 1:30 pm | Competency-Based Training Exercise |
| 2:30 pm | BREAK |
| 2:45 pm | Competency-Based Training Exercise |
| 3:45 pm | Discussion of Competency-Based Training |
| 4:15 pm | Participant “Lessons Learned” Discussion |
| 5:00 pm | ADJOURN |

# Meeting Attendees

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FIRST
ENVIRONMENT

# MEETING NOTES & FEEDBACK

**MORNING**

***Lean and Clean***

Lean and clean
KSA's Knowledge, skills and attributes
Observable, behavioral acts that require a combination of KSA's to execute

Leadership
Empower individuals
Core operations
Business core operations
Body of knowledge
Results

Lean competency table

Doing is never winging it.....plan, do, check, act....planning is approx. 66%
Is it effective?
BOK
Skills
Practicing attributes
Communication-listening
Understanding culture/customs
Manage a team-show CI
Involve employees in the delivery of service
Write a risk management plan (avoidance/reduction)

SME comp/BOK chart completed by large community, not staff
Section 3 or 5 lean culture/atmosphere ... how do you create that? How do you champion?
Section 5.6 address the issue of resistance to change...include positive...why change is good

Tool centric....if they don't work...what do they value in the culture of the company?

Evidence guide relies a lot on references, personal relationships....other observations/operationalize what good interview skills are

Recognition of prior learning (experience)....how do they show it?

Need to ID the system and not just depend on lean tools

What is the baseline to observe evidence? What is the difference between good and bad?

Focus on willingness to change, receptivity of the organization

Outcomes follow-up effectiveness of tools

People focus on events and not day to day...it is a problem with lean

Silo issue....continuous improvement teams and environmental ... need integration bridge....

Simplify!

***Pollution Prevention***

Definition P2 competencies

Glossary or terms for BOK google, wiki, p2rx
Skills:
Are you measuring?
Choosing the right metrics both knowledge and skill
How do you know they work? Secondary effects….observe, be tenacious
Know the process well (manufacturing)
Build BOK from a single question…then listen to the workers. Engagement at the day to day level….what are the struggles in practice…..mentoring….teaching others….learning from others.
How do you know how successfully you are communicating? Body language….help me understand what you do?
ANSI energy standard - aligned with ISO standards…….
Qualify or quantify intangibles …how to?

Business units and facilities …. why do you want to know what they're doing? …always looking for new ideas
i.e. water conservation during drought, backwashing membranes to meet discharge permit

business size, structure, environment etc.
availability of materials, copper, substitution
good writing skills

knowledge of resources, time, finances, talent

Include plant manager in beginning and end….

80/20 pareto applies to specialized selection of p2 skills/attributes
Networking is important for Lean/p2
Maintenance is best networking example in a plant
Benchmarking is visible, user groups

Who do people go to in the plant to work the network?
Are most p2 competencies transferable? Yes

Planning

Planning for lean. Planning needs to deliver on what you are going to do. Money, budgets, cost are important.

Baldridge
Is this result important to the organization?
Did you have a written plan in place to get that result?
Benchmark
Tracking KPI

Planning iso 14001
Making plan visible and effective communication with top management
Involve workers in the planning How do you?
Standard work orders developed by workers….problems are addressed through single manager
APQP - AIAG Auto industry

Continuity, vulnerability, business continuity….disaster….how do you supply parts then?
…part of sustainability

Contingency plan…..anticipating risk

What kind of risk are companies looking at?
-financial
-risk of regulation e.g. cap and trade program
-operational
-reputation risk
-missed market opportunity

ISO 31000 risk management standard (Australian 4360)

Organized knowledge = BOK

**AFTERNOON**

EXERCISE-planning the assignment

Access what you have, is this within your capabilities?
Objectives – charge
Scope/boundaries - include suppliers
Criteria – define success
Conventions=regulations, substances, change out schedules

Write down approach....get agreement
How to deploy
Results what is measured
Improvement

P2 sources
Kirk and Offmer – industrial process encyclopedia
Process flow diagrams
Calls
Help me understand.....
Be systematic.....
Most important
Other peoples knowledge OPK
BOK helps ask better questions...
Help me understand about the product
Help me understand about the process
What are the business constraints?

Are there specific work instructions?
Cmms = computerized maintenance management system
MRP = materials resource planning

EXERCISE- interview

Open broad question to start-----
How?
Who, what, where and why
Number of docs reviewed, number of people
Evidence – legible notes, pattern
Document control policy

**What does the word competency mean to you?**

BEFORE

Meeting your objectives in a quality and efficient manner
Knowledge and skills to get the job done
Intelligence and skills to complete task
Doing your job to the best of your ability
Perform to the best of your ability
Ability to do what you do
Improve what you're tryingproof
Demonstration of knowledge
Do well and do properly
Display of knowledge
Understand project and process
Skills knowledge ability to get things done
Ability to demonstrate knowledge to do task at hand
Knowledge to do
Skills and ability to accomplish a given task
Knowledge skills attribute and experience to do the job
Ability to get things done
Having a working understanding of the subject
Develop ability to perform task
Answer questions people have
Confidence in ability to do what you do and do it well
Skills and knowledge to lead teams
Knowledge and skills  are they the same?

AFTER

Ability to do well.
Know the purpose, how clear is the process.
Embed learning into work. e.TWI = training within industry ww1 ww2.  How do you enable people to understand worker needs.
Ability to have standard work.  Your job is to improve the standard.  Monitor progress to do that.
Boy scouts/girl scouts
Building on knowledge and skills
How do I transfer my knowledge to my people?
Talk, walk demonstrate
Progress in learning
Demonstrate to others, observable
Conscious awareness of attributes
Take all things for granted....good to rethink the process
Difference between qualified and competent, i.e. drivers ed
What is the end game?  Think about behavior and the process rather than the isoteric definition of competency
Confidence as a metric...need competence to gauge confidence
Try to reach the knowledge that's around you.
Open minded and flexible...how much do you want to learn or need to learn?
Demonstrating the ability to do that

**Name one expectation that you have for today's workshop.**

BEFORE

-How does lean and clean fit with p2
-P2 and lean together
-P2 side and immersion in lean and clean
-Outline to do lean and clean
-ID area needed to be greener
-How competency
-Relationship between CBT and other training
-How lean and clean come together
-Networking
-Training integration
-Integrate lean and p2
-New ideas for profit and teaching
-Build confidence in p2 control
-Learn more about sustainability
-Training ideas
-Teaching tool for compliance assistance

AFTER

-Would have liked to learn more about initiatives p2/environmental.
-Will be applying the process of planning into the formation of a recycling team.
-Sometimes you only need to ask.
-Listen to customers better.
-Exercises were more valuable to to help clarify.
-Envision what's going on in order to train in plants
-Obtain prior insight
-Nice opportunity to look at things from a different perspective
-Integrate silos...move closer together
-Gained perspective on how to better apply competency into the market place
-Involve someone else....observe compliment knowledge and skills to manage.
-Connection to lean and green-didn't get that, but leaving thinking about the process (learning).
-More insight into the challenges of industry
-Learned more about lean
-You doon't have to be an expert, need a good network
-Mastery and integration of tools and techniques.